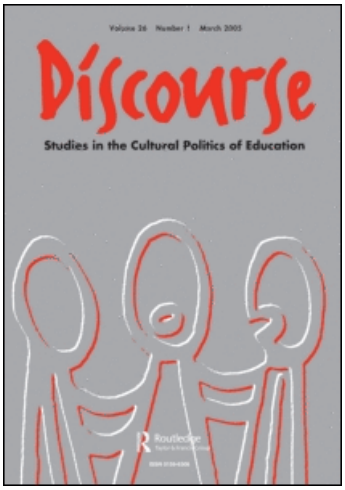
Care, computers and the playground: gender and identity in education

Volman, M.L.L.

published in
Discourse: studies in the cultural politics of education
1997

DOI (link to publisher)
10.1080/0159630970180205

document version
Publisher's PDF, also known as Version of record



Discourse: Studies in the Cultural Politics of Education
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713413500

Care, Computers and the Playground: gender and identity in education

Monique Volman[a]
[a] University of Amsterdam, Wibautstratt, Amsterdam

To cite this Article Volman, Monique(1997) 'Care, Computers and the Playground: gender and identity in education', Discourse: Studies in the Cultural Politics of Education, 18: 2, 229 — 239
To link to this Article: DOI: 10.1080/0159630970180205
URL: http://dx.doi.org/10.1080/0159630970180205

Care, Computers and the Playground: gender and identity in education

MONIQUE VOLMAN, *University of Amsterdam, Wibautstratt, Amsterdam*

Introduction

The pupils of the Princess Juliana School are enjoying their break. A ball is being kicked around the playground and three boys are running after it. Some more boys join in the game. The other children are playing in the corners and along the edges of the playground. A few miles away the second grade students of the Sweelinck comprehensive school are working in the computer lab. A number of girls are waiting for the teacher, holding up their hands; they are stuck. But the teacher is busy. He has to reprimand two boys who are showing the rest of the class how to produce a continuous beep on the computer. Some teachers are spending their free period in the staff room. The biology teacher and one of his colleagues, who recently started teaching the subject Care, are discussing the new subject. He wonders why students cannot learn 'those things' at home, but she is saying that he is prejudiced; Care includes more than learning how to fry an egg.

Poststructuralism or postmodernism are increasingly seen as the dominant discourses on gender and education of the 1990s (e.g. Stone, 1994; Weiner, 1994). The processes in which meanings of gender—of femininity and masculinity—are produced in and in relation to education are central to these approaches. Understanding such processes is important when one wants to develop strategies for gender equality. Although this approach is theoretically well developed and despite the existence of a number of inspiring studies (e.g. Walkerdine, 1989; Davies, 1993) the amount of empirical research into gender and education from a poststructuralist, discursive approach, is small. In the Netherlands, where this article was written, this is partly due to the fact that mainly quantitative research on education is considered for funding.

In this article I will discuss how meanings of gender are produced in educational settings, how these may be 'deconstructed' and how new meanings can be developed. This discussion will be based on the interpretation of material collected in previous studies—not all designed from a discursive approach—that focused on the three issues introduced above, namely the subject Care, the playground, and Information and Computer Literacy classes.[1] The discussion of the production of meanings of gender will be structured according to three 'layers' or levels of gender, which are often distinguished in feminist research: the symbolic level, the level of social structures and organization,

0159-6306/97/020229-11

and the level of individual identities (e.g. Harding, 1986). I will use each example to highlight one of these layers. The production of meanings of gender at the symbolic level is discussed on the basis of an analysis of the debates accompanying the introduction of the subject Care in the first stage of secondary education in the Netherlands. I consider these debates to be a struggle about the meaning of subjects, skills and subject matter, in which 'gender' is an important factor. The example of the playground demonstrates how meanings of gender are rooted in structures, rules and organizational forms—the second level—and how these make existing gender relations seem inevitable. This example will illustrate how meanings of gender have sometimes literally 'materialized', i.e. have taken on a material form. Finally, I will use the example of the computer as an object of learning to discuss the role of education at the third level; education contributes to processes whereby gender becomes part of students' identities.

Before discussing these examples, I will briefly contrast this way of looking at gender and education with the way gender issues are usually approached in recent Dutch educational research.

Gender in Educational Research

A great deal of research has been done on 'gender and education' in the Netherlands in recent decades. However, this research was not usually done from an approach that considers gender as an organizing principle in education at the three levels mentioned above. In the 1970s and early 1980s sociological studies at first focused on the extent of inequality between girls and boys in educational level attained. Later they described how this so-called vertical inequality was replaced by horizontal inequality; girls' educational qualifications are theoretically of a similar level to those of boys but their qualifications offer fewer opportunities for further education and on the labour market. Equal opportunities research was initiated by the government in the early 1980s and attempted to find explanations for gender inequality in education. In the course of the 1980s, further research was done on factors in education which might play a role in girls' socialization. The hidden curriculum in teaching materials, teacher expectations, and interaction in the classroom was scrutinized. More recently, teaching methods and gender differences in learning styles have also become popular research themes. The most conspicuous development of the last ten years, however, is the increasing restriction of research to the problem of the underrepresentation of girls in science and mathematics.[2] Although factors within education are looked at, the choices, achievements and attitudes of girls are seen as *the* problem (Volman, ten Dam & van Eck, 1995).

In this type of research, 'gender' is approached as a characteristic of students or teachers. It is a dichotomous variable with two values: feminine/female and masculine/male. One of these in particular, feminine, is problematic; girls are lagging behind, their choices for 'traditionally female-dominated' courses of study limit their chances on the labour market. In the course of the 1980s, however, an approach was developed in feminist research that looked at gender differently. It was suggested that gender is not only a characteristic of individual women, men, girls and boys, but an organizing principle in every aspect of our society (e.g. Scott, 1986; Hermsen & van Lenning, 1991). What is considered to be feminine and masculine is a historical and cultural product, a 'social construction', and is subject to changes. The idea that social meanings of gender, the symbolic level, are not fixed also has consequences for the other levels of gender. At the level of individual identities, for example, this means that there can be no question of an unequivocal 'socialization' into femininity or masculinity. Individual girls and boys

get different, sometimes even contradictory messages about femininity and masculinity. The theories on gender role socialization that are commonly used in equal opportunities research were criticized from this perspective. Socialization is no longer seen as a linear process with a fixed, clearly defined outcome, but as a process full of contradictions and ambivalences, that is never actually complete (Davies, 1989).

From this perspective, it is suggested that education is one of the producers of meanings of gender. It should not be conceptualized as an institution in which existing gender inequality is reproduced, and where gender role socialization—started in the preschool period—is continued (Ten Dam & Volman, 1991). There are several advantages to such an approach. First, it focuses on the role of education itself in the genesis of gender inequality, thus preventing girls being defined as the problem. Second, this approach focuses attention on potential friction between different meanings of femininity and masculinity, even within education. For example, while advertisements on television promise girls an attractive career if they choose science, the absence of female teachers in the sciences conveys quite another message.

The tenet that education should be seen as a producer of meanings of gender can be illustrated with the help of the three levels introduced above. Education produces 'gender' at the level of social meanings because subjects and skills taught in schools are associated with femininity and masculinity. Thus, technical capacities are linked with masculinity and neatness is ascribed especially to girls. At the level of social organization and structures, the division of labour between men and women stands out. The higher positions in education are mainly held by men, women are overrepresented in primary education and in languages and there are many more male science teachers than female. Further, there are numerous rules and regulations in schools where gender is literally an organizing principle—e.g. separate P.E. classes for girls and boys. At the level of individual identities, education produces 'gender' because an important part of youngsters' time is spent at school during the period in which they develop their gender identity. Experiences at school contribute to the image they have of themselves and of their future role as a woman or a man.

In each of the following three sections, I will focus on one of these levels, using the introduction of the subject Care in the Netherlands, the organization of the playground and computer education as examples.

Reappraisal of a 'Feminine' Field: the subject Care

A common curriculum, also referred to as 'basic education', was introduced in the first stage of secondary education in the Netherlands in 1993. At the very last moment, it was decided to include the subject Care as one of the 15 subjects of the common curriculum. This is considered to be in accordance with one of the aims of the Dutch equal opportunities policy in education: the reappraisal of 'feminine' qualities.[3] The introduction of the subject did not come about without a struggle; it was preceded by years of active lobbying and vehement debates. In this section, I will make an analysis of the debate on the introduction of the subject Care (see also Robijns & Volman, 1991). The principal question in this analysis is 'how did "gender" structure the debate, and which meanings of gender were produced in the debate?'.

From the moment it became clear that a common curriculum was going to become a reality, a plea was heard from many different quarters for Care to be included as one of the subjects that every Dutch student would be taught. It was proposed to include the topics food, housing, health, personal care, relationships, stimulants, consumer education,

care of the environment, labour and leisure. Not only the acquisition of knowledge but also the development of skills and attitudes were to be an essential part of the subject. These were all to be emphatically taught from the perspective of private or personal life.

The Care lobby was supported by organizations in the field of health, consumer issues and environmental protection, but feminist organizations were among the strongest proponents. Their basic argument was that the introduction of the subject Care could contribute to the redistribution of work in the home between women and men. This would remove a significant impediment to women participating in paid labour (Extra & Veneberg, 1987).[4] It was assumed that boys would be more able to take on housework and caring tasks if they were taught these skills at school. Moreover, it was thought that they would learn to appreciate care *en passant.* At the same time, proponents hoped that the inclusion of caring skills in the educational programme would enhance the social status of traditionally female tasks and skills. This would also make it more acceptable for men to become involved in these activities. Another assumption was of a different kind: some proponents thought that adding a subject to the curriculum in which girls have a head start, would enhance girls' self esteem (Weeda, 1987).

Proponents of the subject, which already existed in vocational education as a typical 'girls' subject', tried to give Care a new meaning and status. In the meaning they promoted, however, Care remained a girls' subject, though in a different sense. Care was seen as a subject that is relevant to boys in particular, but with a view to girls' emancipation. The proponents mainly used emancipation arguments in the debate, in which, conspicuously, the emancipation and interests of boys were never mentioned.

At first sight, opponents of the inclusion of the subject Care in the common curriculum seemed to deny the fact that the debate was about a subject with a gender connotation. In their arguments, however, they did make use of the implicit gender-linked meanings of Care. The argument most frequently used against the inclusion of Care was that it could easily be learned at home; precious time at school would be better spent on other subjects. This argument ignores the fact that it is particularly girls who learn something about care at home, and that for girls in 'lower home-economics education' Care had been considered a perfectly suitable school subject before the introduction of basic education. Opponents created an image of a purely practical subject and tried to minimize its importance by emphasizing that Care does not actually require knowledge and hardly any skills. They could rely on a cultural tradition that tends to label knowledge and skills in feminine domains as something that women naturally possess and, as a result, something for which no credit should be given and which does not have to be paid for.

Another argument used by opponents of the subject was that issues in the field of Care were already included in other subjects or could easily be included. The Advisory Council on Government Policy, the architect of the proposal for basic education, was of the opinion that a number of cognitive elements of Care could be included in economics and biology (WRR, 1986). This would mean, however, that the elements concerning the private sphere of life would disappear. The very element that feminist proponents considered essential, constituted a major obstacle for the opponents. Although the term 'gender' is not mentioned, the struggle was about an issue that has a clear gender dimension: to what extent is the State—through education—responsible for matters concerning the private sphere and the relationship between the public and private spheres of life.

This example shows that education plays an important role in the process in which knowledge and skills acquire meaning. The introduction of basic education, which raised

the question, 'what should every Dutch citizen know and be able to do?', was a crucial moment, which was rightly embraced by feminists. Gender plays a role in the decision on what does belong and what does not belong in education. Proponents of the subject tried to give Care a new meaning, but they maintained the link with 'gender' by presenting Care as a subject that, although no longer exclusively suitable for girls, should be taught in the interest of girls' emancipation. Opponents made implicit use of the cultural tradition to deny the value of knowledge and skills associated with women, by suggesting that they do not have to be taught at school. Proponents scarcely responded to this argument.

Although the introduction of the subject Care was seen as a contribution to the revaluation of feminine values, the fact that knowledge and skills in the private sphere are also of general importance was not used as an argument. It is with difficulty that issues with a feminine connotation acquire the status of being of 'general interest'.[5] It would have been worthwhile to make this explicit in the debate and to argue the importance of Care on the basis of a general educational model. Education should prepare pupils to be all-round citizens who can act with competence in all areas of life (Volman & Ten Dam, 1995).

The Playground as a Pedagogical Space

Social relationships and meanings are materialized in various ways in education. The way in which pupils' time in school is structured, for example, does not only reflect developmental psychological insights, but also social ideas about the relationship between labour and leisure. This is also applicable to how space is used in schools, in the corridors, staff rooms, gymnasium and canteen. They provide a structure that reflects the prevailing ideas about relationships between adults and children and among children, and that simultaneously shapes these relationships. The way in which the material design of an educational space, the playground, is shaped by gender relations and conversely how gender relations at school are shaped by the architecture of the playground will be discussed in this section (Arends & Volman, 1990).

Although children spend about a quarter of their time at school in the playground, it receives far less attention as a pedagogical space than the classroom. A group of London artists with a background in pedagogy came to the conclusion that the potential of the playground both spatially and pedagogically was not being fully utilized.[6] They started to 'rebuild' playgrounds; gardens were laid out, murals and marks on the ground were painted, and play objects were installed. They were not only interested in embellishing the environment visually; their starting point was that the way the playground is designed and equipped influences children's behaviour and what they learn.

Initially the main approach of the group to the playground was 'how can we make children feel safe in the space around the school building?'. Gradually, they also started looking at the playground from the perspective of 'equal opportunities' which proved to be something of an eye-opener. The playground is used by different groups of children in very different ways. Not everybody has the same 'rights' in the playground; these differ between girls and boys and between children from different ethnic backgrounds.

The project developed into an action research project carried out by the group in cooperation with schools. It analyzed what usually goes on in the playground with the children, teachers and sometimes also parents. How space is used by children in the playground often appears to reflect and confirm their position in the power structure within the school and the group analyzed how the lay-out of the playground is related

to such power relationships. Playgrounds are mostly large, open spaces and footballs, for example, can go all over the place. Football often dominates the whole playground; there is nothing to stop the ball. The footballers, mostly boys, take up relatively a lot of space, and the area where football is played is seen by pupils as the most important part of the playground. A few boys determine who is 'allowed' on the main part of the playground. Moreover, nobody questions the fact that all this space is only being used for football.

Not only the amount of space used by pupils is significant, but also where this space is located in the playground is important; a place in the centre is better than a place next to a rubbish bin or a door. Boys play in the centre, girls more often around the edges and are often banished to the less popular parts of the playground. Thus, both literally and figuratively girls hold a marginal position in comparison to the boys. A favourite girls' game in one of the schools participating in the project was digging pieces of cement out of the wall with a hairpin, while out of school the same girls appeared to enjoy playing ball games a lot. The 'rules' regulating the interaction between pupils at this school, however, did not only restrict the opportunities for playing of these girls but also their wishes about playing; an example of the 'productive' power of the school. Another example: in one school a group of Asian girls never made use of the playground. They were usually to be found near the toilets. Discussions with the girls revealed that they 'chose' this place because they felt it was the only place where they were tolerated by other pupils.

The school itself unwittingly contributes to the hierarchy in the games that are played, by the way in which the playground is designed. If there is a football goal, for example, but no nice places to just sit, this actually implies that 'sitting and talking' is considered to be of less value than playing football. Children who want to play games for which there is literally no space, readily come to the conclusion that they are less important than others.

Different strategies aimed at changing what happens in the playground are conceivable. A time-table can be introduced indicating which group of children—girls, toddlers, etc.—has first choice of where to play on a particular day. In this project the idea that the lay-out of the playground has an influence on how pupils use it, resulted in 'rebuilding' it in consultation with parents and pupils. Zones were introduced for various activities, in order to make room for different groups of children. An example: girls indicated that they enjoyed performing plays. They used to put two coats on the ground and the area in between them was the stage. It was decided that a small theatre would be built in the playground. A group of children helped design it. Thus, space was literally and figuratively created for girls and by doing so the school demonstrated that their activities were considered to be important (see Arends & Volman, 1990).

The example of the playground shows how rules and meanings pertaining to gender relationships may be materialized in educational settings. Their material form makes them appear unchangeable and inevitable. In this example, the differences between the activities of girls and boys may at first sight have seemed natural. It would be easy to assume that boys do just like to play football and girls prefer talking with friends. However, their 'choice' appeared to be structured by the material conditions of the playground, the design of the playground itself being the materialization of implicit values and meanings that were probably no longer even valid. Changes to the environment—for example, dividing the available space into zones or building a theatre—appeared to make other meanings and relationships possible. The football game lost its status as the most important activity on the playground, which in turn facilitated a shift in the power relationships between footballers and other pupils.

Computers: building gender identity

This section focuses on the role of education in the production of meanings of gender at the individual level, the level of gender identities. I will discuss how the computer becomes gendered—or becomes associated with masculinity and femininity in different ways in pupils' minds during a computer literacy course, causing girls and boys to relate to this object of learning in gender-specific ways.

When basic education was introduced in the Netherlands, not only the subject Care but also the subject Information and Computer Literacy (ICL) became part of the curriculum of the first phase of secondary education. Although many pupils have already used the computer as a tool for learning in primary education, most of them are introduced to the computer as an object of learning for the first time in their school careers in this subject. I observed ICL classes and interviewed girls and boys aged 12 to 15 about computers and ICL (see Volman, 1996).

Pupils usually sit in pairs in the computer lab. Girls choose the computers on one side of the lab and boys those on the other side. If there are different kinds of computers, the boys usually have the better ones (e.g. the faster ones, or those with a colour screen). Girls and boys do not seem to take much notice of each other in the computer lab. Of course there are differences among girls and among boys; some girls and some boys work studiously and quietly, others do not. Yet there are obvious differences between boys in general and girls in general. Boys are usually much more noticeably 'present' in the classroom. They let the teacher know loudly how much they want to start working on the computer and are often actively involved in conversations about new technologies. In the interviews the boys presented themselves as experts; they talked more and with more enthusiasm and imagination; they bragged about computers and technological developments more, using computer jargon and explaining to me what computers can do. One of the boys, for example, talked admiringly about his computer friend:

> He's got a SVGA just for him, ridiculously fast, he's got it in his own room. He can do everything with it—one point five and five point one, or something.

In contrast, most girls talk in a 'down to earth' way about the importance and possibilities of computers, and they think computers are 'just handy things', just machines (see Turkle, 1988) that you will probably need to know about in a future job.

When classroom activities are less task-oriented, boys are also more noticeably present. Getting up and walking around the classroom, taking up a lot of space, and commenting on what others have on their screens, as well as punching friends are all typical behaviour of boys. The computer also features in this behaviour. They shout comments about 'supersonic PCs' across the classroom, and try to attract each other's attention by making their computer beep, turning each other's computer off, or loading a computer game brought from home.

Girls who behave out of the ordinary and who want to attract the teacher's and each other's attention, also use the computer. In their behaviour, however, the computer gets a different meaning. They more often attract attention with an anti-technical attitude or a kind of 'helpless' behaviour: 'Help, it's got a virus!'. While we saw boys trying to attract the teacher's attention with what they know, can do and dare, girls use what they do not know and cannot do to attract attention.

> We don't get it ... Sir, we can't do this.

In the interviews girls avoided using computer terms:

> The other day we had almost taken something off the ... er ... thing.

They also expressed clear reservations about their competence, attributed problems with the computer to their own failure and certainly avoided showing any signs of expertise about computers. One of the girls has her own computer, which she uses for games, writing stories and drawing. But when asked what kind of computer it is, she answered:

> Um, I don't know, oh yes, it does *have* a keyboard.

Many girls emphasize their helplessness:

> When it suddenly broke down, I thought it was me that had done it, because I don't know much about it. I thought that I must have done something wrong, pushed the wrong button.

While boys talked enthusiastically about computers and their possibilities, some girls only opened up when talking about disasters they had experienced with computers. Two friends got a fit of giggles when they told me about a lesson in which they thought they had lost a file.

> We didn't understand. We had pushed the wrong key and ... 'Oh help, I've lost it'. We were sitting in front of this computer and ... 'Oh, has everything gone now?'.

Boys seem to have a positive feeling about knowing a lot about computers and about being skilful at computer games. Most boys are convinced of their competence in using computers. They do not readily attribute a problem to their own mistakes. When two boys for example loaded the wrong file, they called the teacher and told him that there was something wrong with the file, and then started to blame each other. One of the boys told me that everything on the hard disk of his father's computer was deleted after he had used the computer.

> I think there was something wrong with the disk, maybe there was a virus on it, but nobody knows.

Girls who get the right results on the screen still often ask the teacher to be sure.

> Did we do this right?

The common reaction when they make a mistake is to giggle. But girls often present themselves as less expert than they are, and boys' stories are not always based on actual knowledge.

Although pupils enter the classroom with a wide range of gender-linked behaviour, the types of girls' and boys' behaviour and repertoires they show in the ICL lessons are new. These are partly products of education, as the pupils had not been taught about computers and ICL before. By integrating the computer and ICL in existing patterns of behaviour (for example 'not getting it', making a noise and taking up space), they extend their repertoires of genderlinked behaviour at school. The 'expert' repertoires of the boys are extended with stories about the new computer applications that they have learned, the 'outsider' repertoire of the girls with new 'oh help' stories. Boys seem to use the classroom environment to practise a typical masculine form of communication—exchanging information on technology and on their own technical skills (Cockburn, 1985; Wajcman, 1991)—without actually mastering the skills and knowledge presupposed in the repertoires they use. For girls it is not communication about computer expertise they 'practise' in the classroom but about their lack of expertise and that contributes to their identity.

The observations also yielded examples of how elements that extend gender-linked repertoires are offered to pupils in their interaction with the teacher. First, teachers

respond to pupils' behaviour. For example, asking a boy a question in class is frequently preceded by a disciplinary remark. As attempts to draw attention to themselves and pestering other boys are often done by 'experimenting' with the computer, teachers' responses are usually both disapproving *and* interested.

Second, teachers sometimes have their own gender-linked patterns of behaviour. Some teachers find it easier to communicate with boys because of an assumed common interest in and knowledge about computers. When teaching the whole class, boys often receive more attention and are asked more questions, whereas when teachers are helping individual or pairs of pupils, girls receive as much attention as boys. However, the content of the interaction between teachers and pupils often differs, depending on the gender of the pupils. Some teachers ask boys more often about their own experiences, others give boys more opportunities to come up with a solution, whereas they readily take over the work from girls. One of the teachers, for example, asked a boy to fetch some diskettes from his car and to format these. Several teachers asked boys to help. A discussion between a teacher and two boys about the qualities of the new computers in the classroom:

Teacher: Not too bad eh, these computers, not as slow as the old ones.
Boy 1: Our computer at home's slow.
Boy 2: Ha, it's a big old XT.
Teacher: Yes, they're a disaster, true.

This example illustrates the role of education in the development of meanings of femininity and masculinity at an individual level. On the one hand experiences in the classroom contribute to pupils' interpretation of the computer in a gender-specific way. On the other, girls and boys play an active role in the genesis of gender-linked meanings of the computer by using the subject ICL and the computer in the construction of their gender identities. During the ICL lessons pupils extend their gender-linked repertoires with educational experiences. Girls and boys at the age of 12 to 15 are very preoccupied with gender and with becoming women and men. They are actively shaping their gender identities at school by interpreting situations, objects and themselves in terms of gender. The computer is a suitable object for this end, because of its association with masculinity. At the same time, the computer also acquires *new* gendered meanings in this process, and enjoyment of and abilities in the subject information and computer literacy become gendered phenomena. Strategies for change can also be developed at this level. Teachers could challenge the 'expert' and 'outsider' behaviour of the pupils. At least they could look at their own behaviour critically; teachers also assume expertise in boys and reinforce outsider's behaviour in girls by taking problems off their hands, or by joking about instead of questioning an 'outsider' presentation.

Meanings, Structures and Identities

With the help of three examples I have tried to show how three levels of gender—the symbolic, social structures and organization, and the level of individual identities—can be used to analyze how gender is produced in and around education. In each section, one of the levels was highlighted. However, the levels/layers are closely interwoven which is illustrated by the fact that in each of the examples the other levels were indirectly under discussion as well.

The analysis of the debates on the subject Care primarily focused on the symbolic level: which meanings are associated with the subject Care? These debates, however,

concentrated on a change at the structural level, namely the introduction of the subject as a compulsory part of the common curriculum. Moreover, we saw that the subject's proponents expected that this would contribute to changes at the individual level. 'Care' should also become part of the gender identity of boys.

In the school playground the actual and the symbolic space available for girls and boys appeared to be closely linked. This illustrates how closely structures and meanings are interconnected. The project intervened in the material design of the playground with a view to giving girls' and boys' activities a new significance and to facilitating different relationships between children. A change at the individual level was intended as well, however: children should feel safer at school and girls should develop a more positive self image.

Finally, we saw that pupils in ICL lessons used the object of learning—the computer—to construct their gender identities. This is only possible because of the genderlinked meanings of the computer at the social level. At the same time pupils contribute to new social meanings of the subject ICL, which is in danger of becoming a subject in which boys are assumed to be cleverer and more skilled than girls.

An analysis of the development and shift in meanings of 'gender' in and around education necessitates the three levels being considered as an interconnected whole. When strategies for change are developed, all three levels should be taken into consideration. At the beginning of this article it was pointed out that research into gender and education has focused more and more on why girls do not choose maths and science. The analyses presented in this article endeavour to show that these 'choices' are merely links in complex processes in which the gendered meanings of school subjects develop, shift or are reproduced. The starting point, that 'girls make the wrong choices', erroneously situates the problem at the individual level.

Correspondence: Monique Volman, SCO-Kohnstamm Institute of Educational Research, University of Amsterdam, Wibautstratt 4, 1091 GM, Amsterdam.

NOTES

1. I have used the results of three research projects carried out at the SCO-Kohnstamm Institute and the Graduate School of Teaching and Learning of the University of Amsterdam.
2. A common curriculum in secondary education was only introduced in the Netherlands in 1993. Until that date most pupils were directed into either vocational education or general education at the age of 12. In vocational education, a technical, economic, administrative or home economics course of study had to be chosen at the start; in general education maths and science were optional after one or two years.
3. In 1979 a policy document was published in which a number of policy objectives pertaining to gender equality in education were formulated (Ministry of Education and Science, 1979): (1) reduction of factors that hamper freedom of choice, including breaking with traditional sex-stereotyped roles; (2) revaluation of feminine qualities; and (3) increase in educational opportunities for women to enable them to 'catch up'.
4. The level of participation of women in the labour market in the Netherlands is one of the lowest in Europe.
5. It is interesting to note that the relevance and usefulness of the other new subjects in basic education, namely technology and information and computer literacy, were accepted without debate.
6. Islington School Environmental Project.

REFERENCES

ADVISORY COUNCIL ON GOVERNMENT POLICY (WRR) (1986) *Basisvorming in het onderwijs* (The common curriculum in education) (Staatsuitgeverij, Den Haag).

ARENDS, J. & VOLMAN, M. (1990) 'Juf, mag ik vanmiddag binnen blijven?' Het schoolplein als pedagogische ruimte ('Miss, can I stay inside this afternoon?' The playground as teaching space), *Didaktief,* 10, pp. 6–9.

COCKBURN, C. (1985) *Machinery of Dominance: women, men and technical knowhow* (London, Pluto Press).

DAM, G.T., & VOLMAN, M. (1991) Conceptualizing gender differences in educational research: the case of the Netherlands, *British Journal of Sociology of Education,* 12, pp. 309–321.

DAVIES, B. (1989) Education for sexism: a theoretical analysis of the sex/gender bias in education, *Educational Philosophy and Theory,* 21, pp. 1–19.

DAVIES, B. (1993) *Shards of Glass: children reading and writing beyond gendered identities* (Sydney, Allen and Unwin).

EXTRA, J., & VENEBERG, A. (1987) Verzorging (Care), *Vernieuwing, Tijdschrift voor Onderwijs en Opvoeding,* 46, pp. 30–31.

HARDING, S. (1986) *The Science Question in Feminism* (New York, Cornell University Press).

HERMSEN, J.J. & VAN LENNING, A. (Eds) (1991) *Sharing the Difference: feminist debates in Holland* (London/New York, Routledge).

MINISTRY OF EDUCATION AND SCIENCE (1979) Schets van een beleid voor emancipatie in onderwijs en wetenschappelijk onderzoek (Outline of a policy on equal opportunities in education and research) (Ministerie van Onderwijs en Wetenschappen, Den Haag).

ROBIJNS, M. & VOLMAN, M. (1991) *Verzorging, een vak apart? Het leergebied Verzorging in de eerste fase voortgezet onderwijs* (Care, a different subject? The subject Care in the first phase of secondary education) (Amsterdam/Lisse, Swets and Zeitlinger).

SCOTT, J.W. (1986) Gender, a useful category for historical analysis, *American Historical Review,* 91, 1053–1075.

STONE, L. (Ed.) (1994) *The Education Feminism Reader* (New York/London, Routledge).

VOLMAN, M. (1996) Gender-related effects of computer and information literacy education, *Journal of Curriculum Studies* (forthcoming).

VOLMAN, M. & DAM, G.T. (1995) 'Care' for feminist citizenship, paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.

VOLMAN, M., ECK, E. VAN, & DAM, G.T. (1995) Girls in science and technology: the development of a discourse, *Gender and Education,* 7, pp. 283–292.

WAJCMAN, J. (1991) *Feminism Confronts Technology* (University Park, PA, Pennsylvania State University Press).

WALKERDINE, V. (1989) *Counting Girls Out* (London, Virago).

WEEDA, W. (1987) Zorg, zorgelijk, zorgwekkend? (Care, caring, caresome?), *Tijdschrift voor huishoudkunde,* 1, pp. 1–3.

WEINER, G. (1994) *Feminisms in Education: an introduction* (Buckingham, Open University Press).